

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A semiconductor module mountable on an external heat sink, said semiconductor module comprising:

an insulating substrate for said semiconductor module, said insulating substrate including a substrate, a first conductive pattern formed on a first main surface of said substrate which is on the opposite side from said external heat sink, and a second conductive pattern formed on a second main surface of said substrate which is on the same side as said external heat sink and for contact with said external heat sink; and

a mounting frame made of metal and having a mounting surface for contact with said external heat sink, said mounting frame including a flange along a periphery thereof for engagement with a peripheral part of said insulating substrate at said first main surface, said flange pressing said peripheral part of said insulating substrate toward said external heat sink to force said insulating substrate into pressure contact with said external heat sink,

wherein said mounting frame further includes:

a first metal plate having said mounting surface, and

a second metal plate disposed directly on and in contact with said first metal plate and having a protrusion along a periphery thereof projecting from a periphery of said first metal plate to define a said flange.

2. (canceled)

3. (previously presented) The semiconductor module according to claim 1,

wherein the thickness of said first metal plate is equal to the sum of the thickness of said substrate and the thickness of said second conductive pattern; and

wherein the thickness of said second metal plate is equal to the thickness of said first metal plate.

4. (previously presented) The semiconductor module according to claim 1,

wherein said insulating substrate further includes a third conductive pattern formed on said first main surface along a periphery of said substrate; and

wherein said flange and said insulating substrate contact each other, with said third conductive pattern therebetween.

5. (original) The semiconductor module according to claim 4,

wherein said third conductive pattern is formed partially to allow part of said flange to contact said third conductive pattern; and

wherein said mounting frame and said insulating substrate are bonded to each other with an adhesive filling a gap between part of said flange which is out of contact with said third conductive pattern and said first main surface.

6. (canceled).

7. (previously presented) A semiconductor module mountable on an external heat sink, said semiconductor module comprising:

an insulating substrate for said semiconductor module, said insulating substrate including a substrate, a first conductive pattern formed on a first main surface of said substrate which is on the opposite side from said external heat sink, and a second conductive pattern formed on a second main surface of said substrate which is on the same side as said external heat sink and for contact with said external heat sink; and

a mounting frame made of metal and having a mounting surface for contact with said external heat sink, said mounting frame including a flange along a periphery thereof for engagement with a peripheral part of said insulating substrate at said first main surface, said

flange pressing said peripheral part of said insulating substrate toward said external heat sink to force said insulating substrate into pressure contact with said external heat sink,

wherein said insulating substrate further includes a third conductive pattern formed on said first main surface along a periphery of said substrate,

wherein said flange and said insulating substrate contact each other, with said third conductive pattern therebetween,

wherein said third conductive pattern is formed partially to allow part of said flange to contact said third conductive pattern, and

wherein said mounting frame and said insulating substrate are bonded to each other with an adhesive filling a gap between part of said flange which is out of contact with said third conductive pattern and said first main surface.

8. (previously presented) A semiconductor module mountable on an external heat sink, said semiconductor module comprising:

an insulating substrate for said semiconductor module, said insulating substrate including a substrate, a first conductive pattern formed on a first main surface of said substrate which is on the opposite side from said external heat sink, and a second conductive pattern formed on a second main surface of said substrate which is on the same side as said external heat sink and for contact with said external heat sink; and

a mounting frame made of metal and having a mounting surface for contact with said external heat sink, said mounting frame including a flange along a periphery thereof for engagement with a peripheral part of said insulating substrate at said first main surface, said flange pressing said peripheral part of said insulating substrate toward said external heat sink to force said insulating substrate into pressure contact with said external heat sink,

wherein said substrate, said first conductive pattern and said second conductive pattern of said insulating substrate have respective peripheries in alignment with each other; and

wherein said flange presses said periphery of said first conductive pattern on which a semiconductor element is mounted toward said external heat sink, with an insulative material between said flange and said first conductive pattern.

9. (canceled)

10. (canceled)

11. (canceled)

12. (canceled)

13. (previously presented) An insulating substrate for a semiconductor module, said insulating substrate comprising a mounting surface, said mounting surface being adapted to be forced into pressure contact with an external heat sink by a mounting frame pressing a peripheral part of said insulating substrate,

said insulating substrate having a curved configuration in which a peripheral part of said mounting surface warps upwardly away from said external heat sink above a central part of said mounting surface,

said insulating substrate further comprising:

a substrate;

a first conductive pattern formed on a first main surface of said substrate which is on the opposite side from said external heat sink; and

a second conductive pattern formed on a second main surface of said substrate which is on the same side as said external heat sink and having a bottom surface serving as said mounting surface,

wherein only the bottom surface of said second conductive pattern is curved because of a difference in thickness between a central part of said second conductive pattern and a peripheral part thereof.

14. (previously presented) The insulating substrate according to claim 13, wherein said peripheral part of said second conductive pattern has a thickness smaller than said central part of said second conductive pattern.